

Practice: 634 - Waste Transfer**Scenario: #1 - Medium sized wastewater reception basin with 6in conduit transfer pipe to waste storage pond****Scenario Description:**

Installation for a wastewater collection system that includes materials and structures to collect a design volume between 1000 and 5000 gallons of liquids such as silage leachate, lot runoff and other contaminated liquid effluent which is then transferred through a 6" low pressure conduit to the waste storage structure. This scenario includes a reinforced concrete manure reception pit and a 6" PVC SDR 41 conduit to transfer the manure and wastewater to a waste storage pond. Reception Pit includes safety fence w/gate or solid/grated cover. The transfer conduit consists of the pipe plus the inlet structure connection and all other fittings, trench excavation and backfill, labor and equipment for installation. If pumping is required for the pipe flow velocity that needs to be contracted under PS 533, Pumping Plant

Associated practices may include: PS 313 Waste Storage Facility for storage structures; PS 533, Pumping Plant; PS 430, Irrigation Pipeline; PS 632, Solid/Liquid Waste Separation Facility; PS 468, Lined Waterway or Outlet; PS 590 Nutrient Management for waste application; PS 633, Waste Recycling.

This scenario addresses the potential for surface water and groundwater quality degradation from liquid wastewater running unchecked out of silage bunkers and off of animal feeding lots.

Before Situation:

Inadequate storage is available to collect wastewater from an operation that may contaminate surface or groundwater resources. The transfer of waste water to a waste storage facility is required for the CNMP.

After Situation:

This practice scenario is for the estimated design volume for waste collection and transfer of 4300 gallons of liquid waste and can be transferred under gravity or low pressure flow in a 6" PVC pipeline to a waste storage pond. The practice scenario typically includes materials and installation of flat and formed concrete for curbs and gutters at the basin to collect liquid slurry waste and the installation of an 8'x12'x6' reinforced concrete reception pit formed in place that includes safety fence w/gate or solid/grated cover. The transfer pipeline is assumed to be 300 feet long, 6" PVC gasketed SDR 41 pipe with an adapter for the concrete basin, couplers, air-vac vents, all other fittings placed as specified by the design, trench excavation, pipe bedding and backfill. Pipe length for contract is increased by 10% to account for required fittings. The cost includes excavation, placement of subgrade as needed, forming, pouring and finishing of concrete structure and backfilling as well as pipeline installation. Transfer pump if needed must be contracted under pumping plant, PS 533.

Scenario Feature Measure: Collection volume installed

Scenario Unit: Gallon

Scenario Typical Size: 4,300

Scenario Cost: \$13,959.25

Scenario Cost/Unit: \$3.25

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Equipment/Installation						
Demolition, concrete	1498	Demolition and disposal of reinforced concrete structures including slabs and walls. Includes labor and equipment.	Cubic Yard	\$14.21	3	\$42.63
Concrete, CIP, slab on grade, reinforced	37	Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic yard	\$199.44	6	\$1,196.64
Concrete, CIP, formed reinforced	38	Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic yard	\$316.71	14	\$4,433.94
Dozer, 80 HP	929	Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	\$50.16	8	\$401.28
Tractor, agricultural, 120 HP	962	Agricultural tractor with horsepower range of 90 to 140. Equipment and power unit costs. Labor not included.	Hour	\$47.06	16	\$752.96
Backhoe, 80 HP	926	Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	\$41.25	32	\$1,320.00

Labor

Labor

Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	\$22.16	32	\$709.12
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$17.93	96	\$1,721.28
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	\$18.30	24	\$439.20
Supervisor or Manager	234	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	\$32.87	32	\$1,051.84

Materials

Pipe, PVC, 6", SDR 41	984	Materials: - 6" - PVC - SDR 41 100 psi - ASTM D2241	Foot	\$3.23	330	\$1,065.90
Aggregate, Gravel, Ungraded, Quarry Run	1099	Includes materials, equipment and labor	Cubic yard	\$16.13	18	\$290.34
Safety chain tractor barrier	1725	3/8 in. Transport chain barrier installed to prevent tractor equipment from entering wastewater collection basin or pit. Material cost only.	Foot	\$2.78	40	\$111.20

Mobilization

Mobilization, small equipment	1138	Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds.	Each	\$85.78	2	\$171.56
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$125.68	2	\$251.36

Practice: 634 - Waste Transfer**Scenario: #2 - Large sized wastewater reception basin with 8 in conduit transfer pipe to site for waste treatment then transfer separated liquids in 6in pipe to waste storage pond****Scenario Description:**

Installation for a wastewater collection system that includes materials and structures to collect liquids such as lot runoff, manure slurry and other contaminated liquid effluent. The wastewater collected in this 8600 gallon pit is intended to be transferred to final storage within a 48 hour period. The waste is transferred through an 8" conduit to a waste treatment location. After treatment the remaining liquids are transferred to the waste storage pond in a 6" pipeline. This scenario includes a reinforced concrete manure reception pit an 8" conduit to transfer the manure and wastewater to a treatment location and a secondary 6" transfer pipeline. Reception Pit includes safety fence w/gate or solid/grated cover. The 8" transfer conduit and 6" transfer pipeline consists of the pipe plus the inlet structures connections and all other fittings, trench excavation and backfill, labor and equipment for installation. If pumping is required for the pipe flow velocity that needs to be contracted under PS 533, Pumping Plant

Associated practices may include: PS 313 Waste Storage Facility for storage structures; PS 533, Pumping Plant; PS 430, Irrigation Pipeline; PS 632, Solid/Liquid Waste Separation Facility; PS 468, Lined Waterway or Outlet; PS 590 Nutrient Management for waste application; PS 633, Waste Recycling.

This scenario addresses the potential for surface water and groundwater quality degradation from liquid wastewater running unchecked out of silage bunkers and off of animal feeding lots.

Before Situation:

Inadequate storage is available to collect wastewater from an operation that may contaminate surface or groundwater resources. The transfer of waste water to a waste storage facility is required for the CNMP. Additional waste treatment is required for the waste stream prior to reaching in the waste storage pond.

After Situation:

This practice scenario is suitable where the estimated design volume for waste collection and transfer is greater than 5000 gallons of liquid waste and can be transferred under gravity or low pressure flow in an 8" conduit to a waste treatment site. Then the remaining liquids will be transferred in a 6" pipeline to a waste storage pond. The practice scenario typically includes materials and installation of flat and formed concrete for curbs and gutters to collect liquid slurry waste and the installation of an 8'x12'x6' reinforced concrete reception pit formed in place that includes safety fence w/gate or solid/grated cover. The first stage transfer pipeline is assumed to be 200 feet long, 8" PVC gasketed SDR 41 pipe with an adapter for the concrete basin, couplers, air-vac vents, all other fittings placed as specified by the design. The second stage transfer pipe is assumed to be 500 feet long 6" PVC gasketed SDR 41 pipe with an adapter for the wastewater treatment system, couplers, air-vac vents, all other fittings placed as specified by the design.. Pipe length for contract is increased by 10% to account for required fittings. The cost includes excavation, placement of subgrade as needed, forming, pouring and finishing of concrete structure and backfilling as well as pipeline installation costs for trench excavation, pipe bedding and backfill. Transfer pump if needed must be contracted under pumping plant, PS 533.

Scenario Feature Measure: Collection volume installed

Scenario Unit: Gallon

Scenario Typical Size: 8,600

Scenario Cost: \$22,545.17

Scenario Cost/Unit: \$2.62

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Equipment/Installation						
Tractor, agricultural, 120 HP	962	Agricultural tractor with horsepower range of 90 to 140. Equipment and power unit costs. Labor not included.	Hour	\$47.06	24	\$1,129.44
Backhoe, 80 HP	926	Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	\$41.25	40	\$1,650.00
Dozer, 80 HP	929	Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	\$50.16	12	\$601.92
Concrete, CIP, formed reinforced	38	Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic yard	\$316.71	22	\$6,967.62

Equipment/Installation

Concrete, CIP, slab on grade, reinforced	37	Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic yard	\$199.44	11	\$2,193.84
Demolition, concrete	1498	Demolition and disposal of reinforced concrete structures including slabs and walls. Includes labor and equipment.	Cubic Yard	\$14.21	4	\$56.84

Labor

General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$17.93	140	\$2,510.20
Supervisor or Manager	234	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	\$32.87	40	\$1,314.80
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	\$22.16	40	\$886.40
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	\$18.30	36	\$658.80

Materials

Safety chain tractor barrier	1725	3/8 in. Transport chain barrier installed to prevent tractor equipment from entering wastewater collection basin or pit. Material cost only.	Foot	\$2.78	60	\$166.80
Aggregate, Gravel, Ungraded, Quarry Run	1099	Includes materials, equipment and labor	Cubic yard	\$16.13	23	\$370.99
Pipe, PVC, 8", SDR 41	985	Materials: - 8" - PVC - SDR 41 100 psi - ASTM D2241	Foot	\$5.28	550	\$2,904.00
Pipe, PVC, 6", SDR 41	984	Materials: - 6" - PVC - SDR 41 100 psi - ASTM D2241	Foot	\$3.23	220	\$710.60

Mobilization

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$125.68	2	\$251.36
Mobilization, small equipment	1138	Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds.	Each	\$85.78	2	\$171.56

Practice: 634 - Waste Transfer**Scenario: #3 - Concrete Channel with push-off wall at pond and safety gate****Scenario Description:**

Installation of a concrete channel that consists of a slab with curb and footing on each side of the slab for the entire length of the channel to enable the facility manager to direct liquid waste to a collection basin and/or waste storage facility at the end of a push-off ramp. A safety gate is installed at the end of the push-off ramp.

Water quality concerns will be addressed by preventing liquid waste from entering surface waters, and to facilitate timely land application of manure and wastewater at agronomic rates according to the CNMP. This scenario addresses the potential for surface water and groundwater quality degradation.

Associated practices may include: PS 313 Waste Storage Facility for storage structures; PS 533, Pumping Plant; PS 430, Irrigation Pipeline; PS 632, Solid/Liquid Waste Separation Facility; PS 468, Lined Waterway or Outlet; PS 590 Nutrient Management for waste application; PS 633, Waste Recycling.

Before Situation:

Current facility operations are allowing liquid waste to flow uncontrolled during periods of precipitation events or cleaning operations such that water resources can be contaminated.

After Situation:

Typical installation of a 12 foot wide 100' long concrete channel that consists of a 5" thick concrete slab with curbing on each side of the slab that is 2' high, 6" thick with footing for the entire length. The push-off ramp is a concrete cantilever structure that allows the waste to be moved into the storage facility. The purpose is to transfer liquids or manure slurry from one area to a collection basin or waste storage facility. Includes safety gate for human and animal exclusion.

Alternative configurations can consist of the installation of a more narrow or wider channel that may or may not have curbs or a deeper shaped channel and may include a half pipe on the bottom.

Scenario Feature Measure: Bottom surface area of concrete channel

Scenario Unit: Square Foot

Scenario Typical Size: 1,200

Scenario Cost: \$15,292.74

Scenario Cost/Unit: \$12.74

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Equipment/Installation						
Dozer, 80 HP	929	Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	\$50.16	8	\$401.28
Concrete, CIP, formed reinforced	38	Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic yard	\$316.71	17	\$5,384.07
Concrete, CIP, slab on grade, reinforced	37	Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic yard	\$199.44	22	\$4,387.68
Demolition, concrete	1498	Demolition and disposal of reinforced concrete structures including slabs and walls. Includes labor and equipment.	Cubic Yard	\$14.21	5	\$71.05
Labor						
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$17.93	98	\$1,757.14
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	\$22.16	8	\$177.28
Supervisor or Manager	234	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	\$32.87	50	\$1,643.50

Materials

Safety gate, span manure transfer channel or chute	1952	Safety gate to span manure transfer channel at push off wall or chute outlet. Minium of 4' tall with openings that will not pass a 6" or lager sphere. Materials and shipping only.	Foot	\$50.00	16	\$800.00
Aggregate, Gravel, Ungraded, Quarry Run	1099	Includes materials, equipment and labor	Cubic yard	\$16.13	26	\$419.38

Mobilization

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$125.68	2	\$251.36
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Practice: 634 - Waste Transfer**Scenario: #4 - Wastewater Flush Transfer System Pipes only****Scenario Description:**

Installation of the pipe for a manure and wastewater flush system that provides the structures to utilize recycled wastewater to flush waste from a concrete surface into a waste storage pond. This may include pipe and valves, concrete flush lane, concrete curbs or gutter. The animal waste will be transferred by recycled flush water through the pipe system to rinse the concrete production surface and carry the waste to a waste storage pond.

Associated practices may include: PS 313 Waste Storage Facility for storage structures; PS 533, Pumping Plant; PS 430, Irrigation Pipeline; PS 632, Solid/Liquid Waste Separation Facility; PS 468, Lined Waterway or Outlet; PS 590 Nutrient Management for waste application; PS 633, Waste Recycling.

This scenario addresses the potential for surface water and groundwater quality degradation from animal waste.

Before Situation:

An animal production facility does not have an efficient method for collecting and transferring the animal waste produced. Wastewater however is available in a sufficient quantity to provide a flush cycle to clean the production floor and collect the waste materials deposited.

After Situation:

This practice scenario is suitable where wastewater can be recycled for a flush system. Supplemental piping is needed to install the recycled flush water as a means to collect the animal waste deposited on the concrete production surfaces. The pipe design for the flush volume requires 100 feet of 12 inch diameter pipe for pressure flow. The flushed wastes are then piped from an existing collection basin to the waste storage pond an estimated length of 200 feet through a 12 inch diameter low pressure pipe with an open outlet at the pond. The cost includes excavation, placement of bedding as needed, flush and conveyance pipelines with valves and pipe backfill. Pumps must be contracted under pumping plant, PS 533.

Scenario Feature Measure: Flush - pipes

Scenario Unit: Feet

Scenario Typical Size: 300

Scenario Cost: \$14,346.61

Scenario Cost/Unit: \$47.82

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Equipment/Installation						
Backhoe, 80 HP	926	Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	\$41.25	30	\$1,237.50
Concrete, CIP, slab on grade, reinforced	37	Steel reinforced concrete formed and cast-in-place as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic yard	\$199.44	8	\$1,595.52
Earthfill, Manually Compacted	50	Earthfill, manually compacted, includes equipment and labor	Cubic yard	\$4.47	66	\$295.02
Tractor, agricultural, 120 HP	962	Agricultural tractor with horsepower range of 90 to 140. Equipment and power unit costs. Labor not included.	Hour	\$47.06	8	\$376.48
Demolition, concrete	1498	Demolition and disposal of reinforced concrete structures including slabs and walls. Includes labor and equipment.	Cubic Yard	\$14.21	4	\$56.84
Labor						
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$17.93	70	\$1,255.10
Supervisor or Manager	234	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	\$32.87	35	\$1,150.45
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	\$22.16	30	\$664.80

Labor

Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	\$18.30	8	\$146.40
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Materials

Aggregate, Gravel, Ungraded, Quarry Run	1099	Includes materials, equipment and labor	Cubic yard	\$16.13	6	\$96.78
Pipe, PVC, 12", SDR 21	1717	Materials: - 12" - PVC - SDR 21 - ASTM D2241	Foot	\$20.50	110	\$2,255.00
Aggregate, Sand, Graded, Washed	45	Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place	Cubic yard	\$21.56	10	\$215.60
Pipe, PVC, 12", SDR 35	1252	Pipe, PVC, SDR 35, 12" Diameter - ASTM D3034. Material cost only.	Foot	\$20.81	220	\$4,578.20

Mobilization

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$125.68	2	\$251.36
Mobilization, small equipment	1138	Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds.	Each	\$85.78	2	\$171.56

Practice: 634 - Waste Transfer**Scenario: #5 - Gravity flow 30in diameter conduit attached to an existing inlet structure****Scenario Description:**

Gravity flow conduit is typically a large diameter water tight HDPE sanitary sewer pipe used to transfer manure by gravity from one location to another. The gravity transfer system typically consists of an existing inlet structure or hopper with attachment to a smooth interior large diameter pipe. The pipe conveys the slurry waste liquid between the waste collection point and a manure storage or waste treatment structure. Adequate head on the pipe flow or change in elevation must be available for the gravity system to function and should be evaluated by the design engineer. This practice includes the pipe attachment to an existing inlet structure and all other fittings, trench excavation and backfill, labor and a equipment for installation.

This conduit is part of a manure transfer system for a planned waste management or comprehensive nutrient management plan. This scenario addresses the transport of liquid waste to a waste storage or treatment facility to prevent a water quality resource concern of excessive nutrients/organics and harmful levels of pathogens in surface water and/or excessive nutrients/organics in ground water.

Associated practices may include: PS 313 Waste Storage Facility for storage structures; PS 533, Pumping Plant; PS 430, Irrigation Pipeline; PS 632, Solid/Liquid Waste Separation Facility; PS 468, Lined Waterway or Outlet; PS 590 Nutrient Management for waste application; PS 633, Waste Recycling.

Before Situation:

An area of waste production is separated from the waste storage facility and current operations may cause water quality concerns as it is not efficient in transporting the waste to the storage. The site has a change in elevation between production area and treatment or storage structure that is adequate to provide sufficient head for a gravity flow conduit to transport the slurry waste liquid stream.

After Situation:

Install a 150 foot long 30" diameter water tight HDPE pipe to transfer manure by gravity from one location to another. A gravity transfer system typically consists of a sealed inlet at an existing waste collection structure to a smooth interior 30" sewer grade pipe that will gravity flow to an outlet at a site of manure treatment or storage. This scenario includes the pipe, inlet, outlet, couplers and all other fittings, trench excavation, pipe bedding and backfill. The site should be evaluated by the designing engineer to make sure there is adequate elevation drop before contracting. If required an inlet structure may be contracted under another scenario.

The transfer conduit will provide collection and containment of the manure slurry, thereby protecting water quality resources.

Scenario Feature Measure: Length of pipe installed

Scenario Unit: Feet

Scenario Typical Size: 150

Scenario Cost: \$11,634.00

Scenario Cost/Unit: \$77.56

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Equipment/Installation						
Backhoe, 80 HP	926	Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	\$41.25	30	\$1,237.50
Earthfill, Dumped and Spread	51	Earthfill, dumped and spread without compaction effort, includes equipment and labor	Cubic yard	\$2.74	45	\$123.30
Earthfill, Manually Compacted	50	Earthfill, manually compacted, includes equipment and labor	Cubic yard	\$4.47	57	\$254.79
Excavation, Common Earth, side cast, small equipment	48	Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor.	Cubic yard	\$1.81	125	\$226.25
Concrete, CIP, slab on grade, reinforced	37	Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic yard	\$199.44	14	\$2,792.16
Demolition, concrete	1498	Demolition and disposal of reinforced concrete structures including slabs and walls. Includes labor and equipment.	Cubic Yard	\$14.21	7	\$99.47

Labor

Labor

General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$17.93	48	\$860.64
Supervisor or Manager	234	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	\$32.87	20	\$657.40
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	\$22.16	30	\$664.80

Materials

Pipe, HDPE, CPT, Double Wall, Soil Tight, 30"	1247	Pipe, Corrugated HDPE Double Wall, 30" diameter with soil tight joints - AASHTO M294. Material cost only.	Foot	\$25.37	165	\$4,186.05
Aggregate, Sand, Graded, Washed	45	Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place	Cubic yard	\$21.56	13	\$280.28

Mobilization

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$125.68	2	\$251.36
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Practice: 634 - Waste Transfer**Scenario: #6 - Low pressure flow 12in PVC conduit****Scenario Description:**

Low pressure flow conduit is typically a PVC pipeline used to transfer wastewater or manure slurry by pumping from one production location to a storage or treatment location. Low pressure flow PVC transfer pipelines can be between 3" and 30" diameter and are designed for a pumping pressure of no more than 100 psi. The low pressure transfer system typically consists of an inlet structure or hopper connected to a smooth interior PVC pipe sized to deliver the design flow. This practice includes the pipe plus the inlet structure connection and all other fittings, trench excavation and backfill, labor and a equipment for installation.

This conduit is part of a manure transfer system for a planned waste management or comprehensive nutrient management plan. This scenario addresses the transport of liquid waste to a waste storage or treatment to prevent a water quality resource concern of excessive nutrients/organics and harmful levels of pathogens in surface water and/or excessive nutrients/organics in ground water.

Associated practices may include: PS 313 Waste Storage Facility for storage structures; PS 533, Pumping Plant; PS 430, Irrigation Pipeline; PS 632, Solid/Liquid Waste Separation Facility; PS 468, Lined Waterway or Outlet; PS 590 Nutrient Management for waste application; PS 633, Waste Recycling.

Before Situation:

An area of waste production is separated from the waste storage facility and current operations may cause water quality concerns. The site of waste collection or structure has the capacity to install a pumping plant but needs a pipeline to transfer the liquid manure slurry under low pressure from the collection site to the treatment or storage structure.

After Situation:

Install a 300 foot long 12 inch diameter low pressure wastewater pipeline to transfer wastewater or manure slurry from one location to another. The low pressure flow situation refers to pipeflow that has an unrestricted outlet and low pumping head pressure. A pumping plant will send the liquid through a pipe inlet at an existing waste collection basin into a 12 inch diameter pipeline to transfer the design volume to an outlet at the wastewater treatment or storage site. This scenario includes the pipe, inlet connection, outlet, couplers and all other fittings, trench excavation, pipe bedding and backfill. The site should be evaluated by the designing engineer before contracting. If required a pumping plant may be contracted under PS 533, Pumping Plant to support this system.

The low pressure transfer conduit will provide collection, transfer and containment of the manure slurry, thereby protecting water quality resources.

Scenario Feature Measure: Length of pipe installed

Scenario Unit: Feet

Scenario Typical Size: 300

Scenario Cost: \$12,099.94

Scenario Cost/Unit: \$40.33

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Equipment/Installation						
Backhoe, 80 HP	926	Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	\$41.25	32	\$1,320.00
Demolition, concrete	1498	Demolition and disposal of reinforced concrete structures including slabs and walls. Includes labor and equipment.	Cubic Yard	\$14.21	7	\$99.47
Concrete, CIP, slab on grade, reinforced	37	Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic yard	\$199.44	14	\$2,792.16
Excavation, Common Earth, side cast, small equipment	48	Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor.	Cubic yard	\$1.81	97	\$175.57
Earthfill, Dumped and Spread	51	Earthfill, dumped and spread without compaction effort, includes equipment and labor	Cubic yard	\$2.74	33	\$90.42
Earthfill, Manually Compacted	50	Earthfill, manually compacted, includes equipment and labor	Cubic yard	\$4.47	56	\$250.32

Labor

Labor

Supervisor or Manager	234	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	\$32.87	8	\$262.96
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$17.93	64	\$1,147.52
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	\$22.16	32	\$709.12

Materials

Aggregate, Sand, Graded, Washed	45	Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place	Cubic yard	\$21.56	14	\$301.84
Pipe, PVC, 12", SCH 40	1716	Materials: 12" dia. PVC SCH 40, ASTM D1785	Foot	\$14.24	330	\$4,699.20

Mobilization

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$125.68	2	\$251.36
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Practice: 634 - Waste Transfer**Scenario: #7 - Low pressure flow 10in PVC pipeline from waste storage pond to waste application site****Scenario Description:**

Low pressure flow pipeline used to transfer manure wastewater by a low pressure pump from the waste storage pond to the field where it is applied according to the CNMP. The pipeline moves the water from the pond through a buried mainline with low pressure outlets that spread the water on a vegetated treatment area or to a site where the water is applied through an existing field application system. Low pressure flow PVC transfer pipelines can be between 3" and 30" diameter and are designed for a pumping pressure of 100 psi or less. This practice includes the pipe plus an inlet riser structure, clean-out risers and outlet risers plus all other valves and fittings, trench excavation and backfill, labor and a equipment for installation. Appurtenances include: couplings, fittings, air vents, pressure relief valves, thrust blocks, risers, and inline valves, and are included in the cost of pipe material (additional 10% of pipe material quantity). Cost of appurtenances does not include flow meters or backflow preventers. Typical installation applies to soils with no special bedding requirements.

This pipeline is part of a manure transfer system for a planned waste management or comprehensive nutrient management plan. This scenario addresses the transport of liquid waste to a waste storage or treatment facility to prevent a water quality resource concern of excessive nutrients/organics and harmful levels of pathogens in surface water and/or excessive nutrients/organics in ground water.

Associated practices may include: PS 313 Waste Storage Facility for storage structures; PS 533, Pumping Plant; PS 430, Irrigation Pipeline; PS 632, Solid/Liquid Waste Separation Facility; PS 468, Lined Waterway or Outlet; PS 590 Nutrient Management for waste application; PS 633, Waste Recycling; PS 635, Vegetated Treatment Area.

Before Situation:

The waste storage structure is separated from the application fields where wastewater nutrients are needed. Soil nutrients in the near fields have high phosphorus levels from over application near the waste storage facility. The current application operation is high in the use of time and energy and may cause water quality concerns as it is not efficient in transporting the waste to the field.

After Situation:

Install a 1000 foot long 10 inch diameter PVC gasketed IPS pipe that has an SDR of 41 and is water tight under low pressure flow to transfer the manure wastewater. An inlet riser and is located near the pump site of the waste storage pond and designed for the desired pumping pressure and flow volume for the application system. This scenario includes the pipe, inlet riser, couplers, air-vac vents, all other fittings, and risers placed as specified by the design, trench excavation, pipe bedding and backfill. The site should be evaluated by the designing engineer to make sure the design will function.

The transfer pipeline will deliver the manure slurry to the fields for agronomic nutrient utilization according to the CNMP, thereby protecting water quality resources.

Scenario Feature Measure: Length of pipe installed

Scenario Unit: Feet

Scenario Typical Size: 1,000

Scenario Cost: \$20,682.40

Scenario Cost/Unit: \$20.68

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Equipment/Installation						
Concrete, CIP, formless, non reinforced	36	Non reinforced concrete cast-in-placed without forms by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic yard	\$97.85	1	\$97.85
Trenching, Earth, loam, 24" x 48"	54	Trenching, earth, loam, 24" wide x 48" depth, includes equipment and labor for trenching and backfilling	Foot	\$2.42	1000	\$2,420.00
Earthfill, Manually Compacted	50	Earthfill, manually compacted, includes equipment and labor	Cubic yard	\$4.47	127	\$567.69
Labor						
Supervisor or Manager	234	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	\$32.87	20	\$657.40
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$17.93	70	\$1,255.10

Materials

Pipe, PVC, 10", SDR 21	1714	Materials: - 10" - PVC - SDR 21 - ASTM D2241	Foot	\$14.03	1100	\$15,433.00
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Mobilization

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$125.68	2	\$251.36
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Practice: 634 - Waste Transfer**Scenario: #8 - Pressure flow 6in PVC pipeline from waste storage pond to waste application site****Scenario Description:**

Pressure flow pipeline used to transfer manure wastewater by pumping from the waste storage pond to the field where it is to be applied according to the CNMP. Pressure flow transfer pipelines can be between 3" and 12" diameter but 6" diameter is a commonly used pipe size. Pressure pipe will handle an internal pumping pressure between 130 and 200 psi depending on the designed pumping system and must have gasketed joints to seal for the wastewater transfer.

The pressure pipe moves the water by pumping from the intake riser location, through a buried mainline with outlet risers spaced at 300 ft intervals for a traveler applicator. This practice includes the pipe plus an inlet riser structure, clean-out risers and outlet risers plus all other valves and fittings, trench excavation and backfill, labor and a equipment for installation. Appurtenances include: couplings, fittings, air vents, pressure relief valves, thrust blocks, risers, and inline valves, and are included in the cost of pipe material (additional 10% of pipe material quantity). Cost of appurtenances does not include flow meters or backflow preventers. Typical installation applies to soils with no special bedding requirements.

This pipeline is part of a manure transfer system for a planned waste management or comprehensive nutrient management plan. This scenario addresses the transport of liquid waste to a waste storage or treatment facility to prevent a water quality resource concern of excessive nutrients/organics and harmful levels of pathogens in surface water and/or excessive nutrients/organics in ground water.

Associated practices may include: PS 313 Waste Storage Facility for storage structures; PS 533, Pumping Plant; PS 430, Irrigation Pipeline; PS 632, Solid/Liquid Waste Separation Facility; PS 468, Lined Waterway or Outlet; PS 590 Nutrient Management for waste application; PS 633, Waste Recycling; PS 635, Vegetated Treatment Area.

Before Situation:

The waste storage structure is separated from the application fields where wastewater nutrients are needed. Soil nutrients in the near fields have high phosphorus levels from over application near the waste storage facility. The current application operation is high in the use of time and energy and may cause water quality concerns as it is not efficient in transporting the waste to the field.

After Situation:

Install a 1000 foot long 6 inch diameter PVC gasketed IPS pipe that has an SDR of 21 and is water tight under pressure flow to transfer the manure wastewater. An inlet riser and is located near the pump site of the waste storage pond and designed for the desired pressure and flow for the application system. This scenario includes the pipe, inlet riser, couplers, air-vac vents, all other fittings, and risers placed as specified by the design, trench excavation, pipe bedding and backfill. The site should be evaluated by the designing engineer to make sure the design will function.

The transfer pipeline will deliver the manure slurry to the fields for agronomic nutrient utilization according to the CNMP, thereby protecting water quality resources.

Scenario Feature Measure: Length of pipe installed

Scenario Unit: Feet

Scenario Typical Size: 1,000

Scenario Cost: \$11,706.01

Scenario Cost/Unit: \$11.71

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Equipment/Installation						
Earthfill, Manually Compacted	50	Earthfill, manually compacted, includes equipment and labor	Cubic yard	\$4.47	90	\$402.30
Concrete, CIP, formless, non reinforced	36	Non reinforced concrete cast-in-placed without forms by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic yard	\$97.85	1	\$97.85
Trenching, Earth, loam, 24" x 48"	54	Trenching, earth, loam, 24" wide x 48" depth, includes equipment and labor for trenching and backfilling	Foot	\$2.42	1000	\$2,420.00
Labor						
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$17.93	70	\$1,255.10

Labor

Supervisor or Manager	234	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	\$32.87	20	\$657.40
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Materials

Pipe, PVC, 6", SDR 21	987	Materials: - 6" - PVC - SDR 21 200 psi - ASTM D2241	Foot	\$6.02	1100	\$6,622.00
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Mobilization

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$125.68	2	\$251.36
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Practice: 634 - Waste Transfer**Scenario: #9 - Agitator small used for mixing a basin or pit less than 10 feet deep****Scenario Description:**

This scenario is for a manure and wastewater agitator associated with an agricultural production operation to transfer agricultural waste product from the production source to a storage facility for proper utilization. This agitator is typically no more than 15 HP and is used for smaller waste storage facilities that are less than 10 feet deep. This scenario does not include a pump.

Associated practices may include: PS 313 Waste Storage Facility for storage structures; PS 533, Pumping Plant; PS 430, Irrigation Pipeline; PS 632, Solid/Liquid Waste Separation Facility; PS 468, Lined Waterway or Outlet; PS 590 Nutrient Management for waste application; PS 633, Waste Recycling

The waste transfer equipment is installed to address water quality concerns by facilitating timely land application of waste at agronomic rates according to the nutrient management plan. This scenario addresses the potential for surface water and groundwater quality degradation.

Before Situation:

In this typical setting, the operator has a small waste storage structure from a confined animal feeding operation without an effective waste handling and transfer system to manage the waste stream departing from the facility.

After Situation:

The typical installation would be for a small manure 10 HP agitator to put settled manure solids into suspension for removal from an animal waste storage structure and transfer to the next step of waste treatment, utilization or storage. Part of an animal waste management system to address water quality concerns. If required a wastewater reception pit, concrete channel or transfer conduit scenario may need to be contracted to support the operation of this waste transfer system equipment.

Scenario Feature Measure: Agitator for wastewater, installed

Scenario Unit: Each

Scenario Typical Size: 1

Scenario Cost: \$11,573.32

Scenario Cost/Unit: \$11,573.32

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Acquisition of Technical Knowledge						
Training, Workshops	294	Educational seminar or series of meetings emphasizing interaction and exchange of information among a usually small number of participants.	Each	\$116.67	2	\$233.34
Labor						
Skilled Labor	230	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	\$24.58	11	\$270.38
Materials						
Manure agitator, mixing depth less than 10 feet.	1768	Agitator to move put settled manure solids into suspension for removal from an animal waste storage structure. Materials only.	Each	\$11,000.00	1	\$11,000.00
Mobilization						
Mobilization, very small equipment	1137	Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously.	Each	\$34.80	2	\$69.60

Practice: 634 - Waste Transfer**Scenario: #10 - Agitator medium used for mixing a basin 10 to 15 feet deep****Scenario Description:**

This scenario is for a manure and wastewater agitator associated with an agricultural production operation to transfer agricultural waste product from the storage facility to a site for proper utilization. This agitator is typically 30 HP and is used where the waste storage facility tank or pond is between 10 and 15 feet deep. This scenario does not include a pump.

Associated practices may include: PS 313 Waste Storage Facility for storage structures; PS 533, Pumping Plant; PS 430, Irrigation Pipeline; PS 632, Solid/Liquid Waste Separation Facility; PS 468, Lined Waterway or Outlet; PS 590 Nutrient Management for waste application; PS 633, Waste Recycling

The waste transfer equipment is installed to address water quality concerns by facilitating timely land application of waste at agronomic rates according to the nutrient management plan. This scenario addresses the potential for surface water and groundwater quality degradation.

Before Situation:

In this typical setting, the operator has waste production from a confined animal feeding operation without an effective waste handling and transfer system to manage the waste stream departing from the facility.

After Situation:

A typical installation would be for a medium 30 HP manure agitator to put settled manure solids into suspension for removal from an animal waste storage structure and transfer to the next step of waste treatment, utilization or storage. Part of an animal waste management system to address water quality concerns. If required a wastewater reception pit, concrete channel or transfer conduit scenario may need to be contracted to support the operation of this waste transfer system equipment.

Scenario Feature Measure: Agitator for wastewater, installed

Scenario Unit: Each

Scenario Typical Size: 1

Scenario Cost: \$17,699.86

Scenario Cost/Unit: \$17,699.86

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Acquisition of Technical Knowledge						
Training, Workshops	294	Educational seminar or series of meetings emphasizing interaction and exchange of information among a usually small number of participants.	Each	\$116.67	2	\$233.34
Labor						
Skilled Labor	230	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	\$24.58	12	\$294.96
Materials						
Manure agitator, mixing depth 10 to 15 feet deep	1766	Agitator to move put settled manure solids into suspension for removal from an animal waste storage structure. Materials only.	Each	\$17,000.00	1	\$17,000.00
Mobilization						
Mobilization, small equipment	1138	Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds.	Each	\$85.78	2	\$171.56

Practice: 634 - Waste Transfer**Scenario: #11 - Agitator large used for mixing a tank over 15 feet deep****Scenario Description:**

This scenario is for a large manure and wastewater agitator associated with an agricultural production operation to transfer agricultural waste product from the storage facility to a site for proper utilization. This agitator is typically 100 HP and is used where the waste storage facility tank or pond is greater than 15 feet deep. This scenario does not include a pump.

Associated practices may include: PS 313 Waste Storage Facility for storage structures; PS 533, Pumping Plant; PS 430, Irrigation Pipeline; PS 632, Solid/Liquid Waste Separation Facility; PS 468, Lined Waterway or Outlet; PS 590 Nutrient Management for waste application; PS 633, Waste Recycling

The waste transfer equipment is installed to address water quality concerns by facilitating timely land application of waste at agronomic rates according to the nutrient management plan. This scenario addresses the potential for surface water and groundwater quality degradation.

Before Situation:

In this typical setting, the operator has waste production from a confined animal feeding operation without an effective waste handling and transfer system to manage the waste stream departing from the facility.

After Situation:

A typical installation would be for a large 100 HP manure agitator to put settled manure solids into suspension for removal from an animal waste storage structure and facilitate the transfer of this material to the next step of waste treatment or utilization. This agitator is for a tank deeper than 15 feet and is part of an animal waste management system to address water quality concerns. This covers the cost of the agitator equipment materials and labor for the electrical hook-up.

Scenario Feature Measure: Agitator for wastewater, installed

Scenario Unit: Each

Scenario Typical Size: 1

Scenario Cost: \$25,779.66

Scenario Cost/Unit: \$25,779.66

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Acquisition of Technical Knowledge						
Training, Workshops	294	Educational seminar or series of meetings emphasizing interaction and exchange of information among a usually small number of participants.	Each	\$116.67	2	\$233.34
Labor						
Skilled Labor	230	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	\$24.58	12	\$294.96
Materials						
Manure agitator, mixing depth greater than 15 feet deep.	1767	Agitator to move put settled manure solids into suspension for removal from an animal waste storage structure. Materials only.	Each	\$25,000.00	1	\$25,000.00
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$125.68	2	\$251.36

Practice: 634 - Waste Transfer**Scenario: #12 - Waste hauling****Scenario Description:**

This scenario describes hauling of animal manure to agricultural land for final utilization. This scenario can be used for any distances greater than 10 miles. It is intended to be used in high risk water quality drainage areas or when soil test phosphorus exceeds the allowable limit on fields that have typically been used for manure application. This waste transfer payment is intended to offset additional costs associated with hauling the manure out of the high risk drainage area or transported a longer distance to fields with low soil test phosphorus. Limits of soil test phosphorus for contracting purposes need to meet acceptable state criteria.

Associated practices may include: PS 313 Waste Storage Facility for storage structures; PS 533, Pumping Plant; PS 430, Irrigation Pipeline; PS 632, Solid/Liquid Waste Separation Facility; PS 468, Lined Waterway or Outlet; PS 590 Nutrient Management for waste application; PS 633, Waste Recycling and Concrete channel and Transfer conduit scenario 634 - Waste Transfer.

This practice scenario addresses the water quality concerns for excessive nutrients or degradation of water resources from over application of manure on local fields.

Before Situation:

The local drainage area is at high risk for phosphorus leaving the fields in the runoff solution and further manure waste application will likely cause water quality degradation.

After Situation:

Trucks are loaded with 80 tons of manure solids and hauled 55 miles outside of the high risk drainage area to a location where phosphorus levels are in the low risk category according to the PhosphorusRisk index for leaving the fields.

Waste is transferred out of the critical drainage area for use as fertilizer on crops and pasture land.

Scenario Feature Measure: Ton of waste and miles hauled

Scenario Unit: Ton-mile

Scenario Typical Size: 4,400

Scenario Cost: \$719.08

Scenario Cost/Unit: \$0.16

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Equipment/Installation						
Manure Hauling, solid manure, transportation	2031	Transportation cost of hauling solid manure. Trucking costs based on tons hauled times miles. Includes equipment, power unit and labor. Does not include costs for loading or unloading.	Ton-Mile	\$0.11	4400	\$484.00
Mobilization						
Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	\$235.08	1	\$235.08

Practice: 634 - Waste Transfer**Scenario: #13 - Pressure flow 4in PVC pipeline from waste storage pond to waste application site****Scenario Description:**

Pressure flow pipeline used to transfer manure wastewater by pumping from the waste storage pond to the field where it is to be applied according to the CNMP. Pressure flow transfer pipelines can be between 3" and 12" diameter but 4" diameter is a commonly used pipe size. Pressure pipe will handle an internal pumping pressure between 130 and 200 psi depending on the designed pumping system and must have gasketed joints to seal for the wastewater transfer.

The pressure pipe moves the water by pumping from the intake riser location, through a buried mainline with outlet risers spaced at 300 ft intervals for a traveler applicator. This practice includes the pipe plus an inlet riser structure, clean-out risers and outlet risers plus all other valves and fittings, trench excavation and backfill, labor and a equipment for installation. Appurtenances include: couplings, fittings, air vents, pressure relief valves, thrust blocks, risers, and inline valves, and are included in the cost of pipe material (additional 10% of pipe material quantity). Cost of appurtenances does not include flow meters or backflow preventers. Typical installation applies to soils with no special bedding requirements.

This pipeline is part of a manure transfer system for a planned waste management or comprehensive nutrient management plan. This scenario addresses the transport of liquid waste to a waste storage or treatment facility to prevent a water quality resource concern of excessive nutrients/organics and harmful levels of pathogens in surface water and/or excessive nutrients/organics in ground water.

Associated practices may include: PS 313 Waste Storage Facility for storage structures; PS 533, Pumping Plant; PS 430, Irrigation Pipeline; PS 632, Solid/Liquid Waste Separation Facility; PS 468, Lined Waterway or Outlet; PS 590 Nutrient Management for waste application; PS 633, Waste Recycling; PS 635, Vegetated Treatment Area.

Before Situation:

The waste storage structure is separated from the application fields where wastewater nutrients are needed. Soil nutrients in the near fields have high phosphorus levels from over application near the waste storage facility. The current application operation is high in the use of time and energy and may cause water quality concerns as it is not efficient in transporting the waste to the field.

After Situation:

Install a 1000 foot long 4 inch diameter PVC gasketed IPS pipe that has an SDR of 21 and is water tight under pressure flow to transfer the manure wastewater. An inlet riser and is located near the pump site of the waste storage pond and designed for the desired pressure and flow for the application system. This scenario includes the pipe, inlet riser, couplers, air-vac vents, all other fittings, and risers placed as specified by the design, trench excavation, pipe bedding and backfill. The site should be evaluated by the designing engineer to make sure the design will function.

The transfer pipeline will deliver the manure slurry to the fields for agronomic nutrient utilization according to the CNMP, thereby protecting water quality resources.

Scenario Feature Measure: Length of pipe installed

Scenario Unit: Feet

Scenario Typical Size: 1,000

Scenario Cost: \$7,658.91

Scenario Cost/Unit: \$7.66

Cost Details (by category):

Component Name	ID	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Equipment/Installation						
Concrete, CIP, formless, non reinforced	36	Non reinforced concrete cast-in-placed without forms by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic yard	\$97.85	1	\$97.85
Earthfill, Manually Compacted	50	Earthfill, manually compacted, includes equipment and labor	Cubic yard	\$4.47	90	\$402.30
Trenching, Earth, loam, 24" x 48"	54	Trenching, earth, loam, 24" wide x 48" depth, includes equipment and labor for trenching and backfilling	Foot	\$2.42	1000	\$2,420.00
Labor						
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$17.93	70	\$1,255.10

Labor

Supervisor or Manager	234	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	\$32.87	20	\$657.40
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Materials

Pipe, PVC, 4", SDR 21	986	Materials: - 4" - PVC - SDR 21 200 psi - ASTM D2241	Foot	\$2.79	1000	\$2,790.00
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Mobilization

Mobilization, Light Equipment Operator	1143	Mobilization of light equipment operators: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	\$18.13	2	\$36.26
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